Heading

Fact analysis into use of LNG for trucks and ships – review of pollutant and GHG emissions (final)

Summary:

Several studies in the Netherlands had previously addressed the possibilities of using natural gas or alternative fuels for transportation and so fulfil future greenhouse gas (GHG) requirements. These studies covered pollutant and GHG emissions for road, inland water and ocean-going transport. Later, several stakeholders wanted to update this information, evaluate it and compare in more detail the possibilities offered by several alternative fuels. The result is this report.

Background:

The study sought to evaluate the following alternative fuels: LNG (Liquefied Natural Gas), biogas (Compressed BioGas, also called bio-CNG or Liquid BioMethane, also called bio-LNG) and liquid biofuels (biodiesel or FAME and Hydrogenated Vegetable Oil or HVO). Charts were produced for a number of reference vehicles and ships, with pollutant emissions and GHG emissions using a number of fossil and biofuel options.

Key earlier projects used in the analysis were the 2013 study, ‘Natural Gas in Transport’, and the ‘Dutch fuel mix assessment’. Both studies were done with CE Delft, ECN, TNO and the Dutch Ministry of Infrastructure and the Environment (I&M), plus many outside experts and stakeholders. The reference period of this study is 2015 to 2020, so the technical solutions, performance findings and emission levels relate to products entering the market during this period.

Project objective:

The objectives of this project were to:

* Compare pollutant and GHG emissions of LNG and several biofuels with diesel fuel for three transport modalities: heavy-goods vehicles, inland ships and ocean-going ships
* Review the availability of different biofuels
* Review the results with experts and stakeholders

Project results:

The following reflect some but all of the conclusions, with the first being that using LNG for trucks would lead to a GHG reduction of 10-15%. This assumes that that increase in energy consumption of gas engines could be limited to 5-10%. On the pollution front, the Euro VI regulations are expected to reduce emissions to very low anyway, with some indicators that gas engines may show significantly lower NOx and PM emissions. However, trucks (and ships) with gas engines are quieter than diesel ones.

For ships, LNG was found to reduce NOx and particulate mass emissions for both inland and ocean-going ship engines by more than 75%, in general, versus conventional diesel engines. Ocean-going vessels would also show 90% lower SOx emissions, and the reductions are even greater when gas engines replace diesel engines that use MDO/HFO and/or older diesel engines. To achieve substantial GHG emission reduction would require biofuels, especially those using residual or waster-stream feedstocks.

A final key point noted in the report is that with methane having a higher climate effect than CO2, it is important to minimise methane leakages during the production and distribution of natural gas.